Having described the invention, the following is claimed:

1. An apparatus for sensing a concentration of vaporized hydrogen peroxide, comprising:

a sensing element comprised of an electroactive material, wherein said sensing element is exposed to vaporized hydrogen peroxide inside a chamber; and

means for determining a change in an electrical property of the electroactive material, wherein said change in the electrical property varies in accordance with a change in the concentration of the vaporized hydrogen peroxide in the chamber.

2. An apparatus according to claim 1, wherein said electroactive material includes an electroactive polymer.

3. An apparatus according to claim 2, wherein said electroactive polymer is polyacetylene.

4. An apparatus according to claim 2, wherein said electroactive polymer is doped with a dopant reactive with vaporized hydrogen peroxide.

5. An apparatus according to claim 4, wherein said dopant is iodine.

6. An apparatus according to claim 1, wherein said electroactive material includes pitch-based carbon/graphite fibers.

7. An apparatus according to claim 6, wherein said pitch-based carbon/graphite fibers are intercalated with bromine molecules.

8. An apparatus according to claim 1, wherein apparatus further comprises heating means for increasing the temperature of the electroactive material.

9. An apparatus according to claim 8, wherein said heating means provides an electrical current through the electroactive material, said electrical current used to measure the electrical property.

10. An apparatus according to claim 1, wherein said apparatus further comprises:

memory means for storing a plurality of data sets in a memory, wherein said data sets includes a value indicative of said electrical property as a function of time exposure to vaporized hydrogen peroxide.

11. An apparatus according to claim 10, wherein said value is a slope.

12. An apparatus according to claim 10, wherein said apparatus further comprises:

means for interpolating or extrapolating data from the plurality of data sets stored in a memory.

13. A method for sensing a concentration of vaporized hydrogen peroxide, the method comprising:

exposing a sensing element to vaporized hydrogen peroxide inside a chamber, wherein said sensing element includes an electroactive material; and

determining a change in an electrical property of the electroactive material, wherein said change in the electrical property varies in accordance with a change in the concentration of the vaporized hydrogen peroxide in the chamber.

14. A method according to claim 13, wherein said electroactive material includes an electroactive polymer.

15. A method according to claim 14, wherein said electroactive polymer is polyacetylene.

16. A method according to claim 14, wherein said electroactive polymer is doped with a dopant reactive with vaporized hydrogen peroxide.

17. A method according to claim 16, wherein said dopant is iodine.

18. A method according to claim 13, wherein said electroactive material includes pitch-based carbon/graphite fibers.

19. A method according to claim 18, wherein said pitch-based carbon/graphite fibers are intercalated with bromine molecules.

20. A method according to claim 13, wherein method further comprises the step of:

heating the electroactive material to increase the temperature thereof.

21. A method according to claim 20, wherein said heating is provided by an electrical current passing through the electroactive material, said electrical current used to measure the electrical property.

22. A method according to claim 13, wherein said method further comprises the step of:

storing a plurality of data sets in a memory, wherein said data sets include a value indicative of said electrical property as a function of time exposure to vaporized hydrogen peroxide.

23. A method according to claim 22, wherein said value is a slope.

24. A method according to claim 22, wherein said method further comprises the step of:

interpolating or extrapolating data from the plurality of data sets stored in a memory.

25. A sensor for the detection of a concentration of a chemical component, comprising:

a host material;

an additive that modifies an electrical property of the host material, the additive having a chemical reaction when exposed to the chemical component;

a source of electrical current, said electrical current conducting through the host material; and

means for measuring a change in the electrical property of the host material as the chemical component reacts with the additive.

26. A sensor according to claim 25, wherein said chemical reaction having a reaction rate that is a function of the heat generated by said electrical current, as said electrical current conducts through said host material.

27. A sensor according to claim 25, wherein said chemical component is selected from the group consisting of: a gas and a liquid.

28. A sensor according to claim 25, wherein said chemical component is selected from the group consisting of: a gaseous or a vaporous sterilant, and a liquid sterilant.

29. A sensor according to claim 25, wherein said chemical component is selected from the group consisting of: hypochlorites, iodophors, quaternary ammonium chlorides (Quats), acid sanitizers, aldehydes (formaldehyde and glutaraldehyde), alcohols, phenolics, peracetic acid (PAA), chlorine dioxide, and mixtures thereof.

30. A sensor according to claim 25, wherein said chemical component is selected from the group consisting of: vaporized hydrogen peroxide, vaporized bleach, vaporized peracid, vaporized peracetic acid, ozone, ethylene oxide, chlorine dioxide, halogen containing compounds, and mixtures thereof.

31. A sensor according to claim 30, wherein said halogen containing compound includes a halogen selected from the group consisting of: chlorine, fluorine and bromine.

32. A sensor according to claim 25, wherein said chemical component is selected from the group consisting of: liquid hydrogen peroxide, a peracid, bleach, ammonia, ethylene oxide, fluorine containing chemicals, chlorine containing chemicals, bromine containing chemicals, and mixtures thereof.

33. A sensor according to claim 25, wherein said host material is an electroactive material.

34. A sensor according to claim 33, wherein said electroactive material includes an electroactive polymer.

35. A sensor according to claim 34, wherein said electroactive polymer is polyacetylene.

36. A sensor according to claim 25, wherein said additive includes a dopant reactive with the chemical component.

37. A sensor according to claim 36, wherein said dopant is iodine.

38. A sensor according to claim 25, wherein said host material includes pitch-based carbon/graphite fibers.

39. A sensor according to claim 25, wherein said additive includes bromine molecules.

40. A sensor according to claim 25, wherein said source of electrical current increases the temperature of the host material.

41. A sensor according to claim 25, wherein said sensor further comprises:

memory means for storing a plurality of data sets in a memory, wherein said data sets includes a value indicative of said electrical property as a function of time exposure to the chemical component.

42. A sensor according to claim 41, wherein said value is a slope.

43. A sensor according to claim 41, wherein said sensor further comprises:

means for interpolating or extrapolating data from the plurality of data sets stored in said memory means.

44. A sensor according to claim 25, wherein at least a portion of said host material includes an amorphous region.

45. A method for sensing a concentration of a chemical component in a chamber, the method comprising:

exposing a sensing element to the chemical component inside the chamber, wherein said sensing element includes an electroactive material;

determining a change in an electrical property of the electroactive material, wherein said change in the electrical property varies in accordance with a change in the concentration of the chemical component in the chamber; and

storing a plurality of data sets in a memory, wherein said data sets include a value indicative of said electrical property as a function of time exposure to the chemical component.

46. A method according to claim 45, wherein said chemical component is selected from the group consisting of: gaseous or vaporous sterilants, and liquid sterilants.

47. A method according to claim 45, wherein said chemical component is selected from the group consisting of: vaporized hydrogen peroxide, vaporized bleach, vaporized peracid, vaporized peracetic acid, ozone, ethylene oxide, chlorine dioxide, halogen containing compounds, and mixtures thereof.

48. A method according to claim 47, wherein said halogen containing compound includes a halogen selected from the group consisting of: chlorine, fluorine and bromine.

49. A method according to claim 45, wherein said electroactive material is an electroactive polymer.

50. A method according to claim 49, wherein said electroactive polymer is polyacetylene.

51. A method according to claim 45, wherein said electroactive material is doped with a dopant reactive with the chemical component.

52. A method according to claim 51, wherein said dopant is iodine.

53. A method according to claim 45, wherein said electroactive material includes pitch-based carbon/graphite fibers.

54. A method according to claim 53, wherein said pitch-based carbon/graphite fibers are intercalated with bromine molecules.

55. A method according to claim 45, wherein said method further comprises the step of:

heating the sensing element to increase the temperature thereof.

56. A method according to claim 55, wherein said heating is provided by an electrical current passing through the electroactive material, said electrical current used to measure the electrical property.

57. A method according to claim 45, wherein said method further comprises the step of:

storing a plurality of data sets in a memory, wherein said data sets includes a value indicative of said electrical property as a function of time exposure to the gaseous or vaporous sterilant.

58. A method according to claim 57, wherein said value is a slope.

59. A method according to claim 57, wherein said method further comprises the step of:

interpolating or extrapolating data from the plurality of data sets stored in said memory.

60. A method according to claim 45, wherein at least a portion of said electroactive material includes an amorphous region.